Notes on the Chinese *Calliprogonos miraculosa* Mell, 1937 (Lepidoptera: Brahmaeidae)

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Abstract: The rediscovery of *Calliprogonos miraculosa* Mell, 1937 (Brahmaeidae) from the Chinese province of Sichuan is reported, 70 years after the first specimens were collected in Shaanxi, allowing, for the first time, the description of the female and the illustration of the male genitalia. Short notes on the nomenclature and taxonomy of the genus are presented.

Key words: Brahmaeidae, Lemoniidae, *Calliprogonos miraculosa* rediscovered, China.

Anmerkungen zur chinesischen *Calliprogonos miraculosa* Mell, 1937 (Lepidoptera: Brahmaeidae)

Zusammenfassung: *Calliprogonos miraculosa* Mell, 1937 (Brahmaeidae) wurde nach mehr als 70 Jahren erstmals in der chinesischen Provinz Sichuan wieder nachgewiesen; die ursprünglichen Typen stammten aus Shaanxi. Eine kleine Serie von Faltern in der Sammlung des Autors erlaubt weitere Studien dieser seltenen Art, die hoffentlich in naher Zukunft weitere Erkenntnisse zur Phylogenie der Brahmaeidae und zur Einordnung der Gattung in die Familie möglich machen werden. In der vorliegenden Arbeit werden das bislang unbekannte Weibchen beschrieben und die männlichen Genitalstrukturen erstmals abgebildet. Es werden ein kurzer Überblick zu taxonomischen Problemen verursacht von Mell sowie einige Anmerkungen zu einer kürzlich erschienenen Arbeit von Zwick zur Phylogenie der Bombycoidea präsentiert.

Introduction

The family Brahmaeidae was traditionally considered to comprise 5 genera, namely the Eurasian *Brahmaea* Walker, 1855 (with questionable subgenera *Brahmaea, Brahmophthalma* Mell, 1930 and *Brachygnatha* Zhang & Yang, 1993), the monotypic Italian *Acanthobrahmaea* Sauter, 1967, the Chinese *Calliprogonos* Mell & Hering, 1937, the African *Dactyloceras* Mell, 1927 (with subgenera *Dactyloceras* and *Shinocksiceras* Bouyer, 2002), and *Spiramiopsis* Hampson, 1901 from southern Africa (Minet 1994: 84, Oberprieler & Duke 1994: 202, Lemaire & Minet 1999: 342 *ff*.). Recently, however, Zwick (2008: 200) reassigned the two genera of the family Lemoniidae, *Lemonia* Hübner, 1820 and *Sabalia* Walker, 1865, to Brahmaeidae, as had already been proposed by Karsch (1898: 291) over a century ago.

Calliprogonos was until recently known only from its type series of 3 ♂♂, collected in 1935 in the Taibai Shan mountain range of the Shaanxi Province in China and housed in the Museum Alexander Koenig in Bonn, Germany (HT, 1 PT labelled "Tapaishan im Tsinling, Süd-Shensi [= Shaanxi], (China), 29. [HT]/23. [PT] vi. 1935, H. Höne"; HT see Fig. 1), and The Natural History Museum, London, U.K. (1 PT, photo in Lemaire & Minet 1999: 343). The latter paratype was, according to the original description of the species, originally deposited in the Museum für Naturkunde der Humboldt-Universität, Berlin, Germany, and the details of its transfer to London are unclear.

Only in 2006 another specimen of this rare taxon was collected in the Sichuan province and transferred via Victor Siniaev, Moscow, to the author's collection. It is also a ♂ and labelled: "PR China, Sichuan Province, Siguliang Shan, 31°9' N, 103°6' E, v. 2006, GP 1563/06 Naumann, barcode SNB 0211"; it has a fwl. of 33 mm and agrees closely in habitus with the type specimens. Its genitalia also agree with those of the PT in Bonn, as kindly submitted by Wolfgang A. Nässig, Frankfurt am Main (GP 209/84 Nässig; including preparations of the legs, see in Fig. 8). The details of the locality of the new specimen enabled V. Siniaev to collect a small series of specimens a year later at a place nearby. These specimens, also in the author's collection, comprise 5 ♂♂ and the first known ♀ (Figs. 2–5) and bear the following data: "PR China, Sichuan province, 25 km W Guan Xian, 31°4' N, 103°23' E, 1700 m, 2.–15. viii. 2007, leg. V. Siniaev, ♂ genitalia no. 1765/08 Naumann". A 6th ♂ of the same series is in the collection of Steve Kohll, Luxembourg.

Calliprogonos miraculosa has been omitted from recent Chinese literature on Brahmaeidae (e.g. Zhu & Wang 1983). It is evidently rare and difficult to collect, as also attested by several unsuccessful attempts by V. Siniaev to find it at a number of different altitudes in Taibai Shan, close to the type locality, which was unfortunately not described very accurately by Mell or on Höne's locality label.

Based on these 8 new specimens, *Calliprogonos miraculosa* is redescribed below, including also features of the ♀.

Abbreviations

Fw.	Forewing.
Fwl.	Forewing length (measured in a straight line from the wing base to the most distant point of the apex).
GP[s]	Genitalia preparation[s] (with dissection no.).
HT	Holotype.
Hw.	Hindwing.
Hwl.	Hindwing length.
PT	paratype.

Redescription

♂. The new specimens (Figs. 2, 3) show all features described by Mell (1937b: 9; see Fig. 1), i.e. dark greyish-black ground colour without wavy lines on fw. and hw., fw. upperside with subcircular basal field consisting of a

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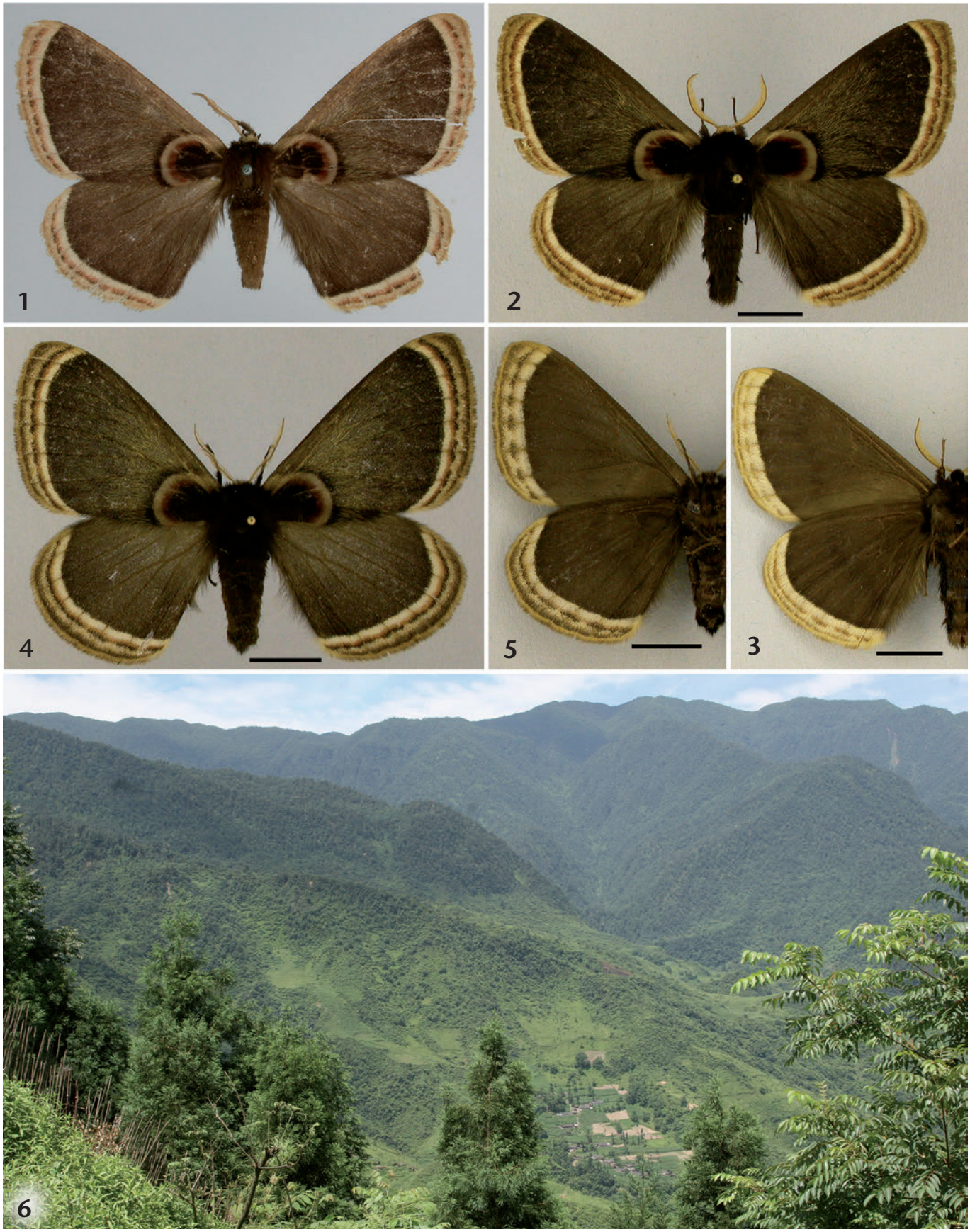

Fig. 1–5: *Calliprogonos miraculosa*. **Fig. 1:** ♂ HT, dorsal view, PR China, Shaanxi (MAKB). **Fig. 2:** ♂, dorsal view, PR China, Sichuan (CSNB). **Fig. 3:** same specimen, ventral view. **Fig. 4:** ♀, dorsal view, PR China, Sichuan (CSNB). **Fig. 5:** same specimen, ventral view. — Scale bars 1 cm. — **Fig. 6:** Habitat in Sichuan Province, W. Guan Xian; photo V. Siniaev.

black base and consecutively a brown, greyish white and black semicircular line that together form the antemedian fascia, outer field consisting of (from inner to outer margin) a white, orange-brown, black, greyish-brown, black and again greyish brown band, hw. upperside without antemedian fascia but with similar outer field; proximal half of fw. and hw. covered with sparse, long, yellowish-brown hairs in fresh specimens; fw. under-

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side without antemedian (basal) field but otherwise as upperside, except outer margin slightly paler. Fwl. 31–34 mm. Head, thorax, legs and abdomen black, collar ochreous, antenna ochreous-brown, 10.0–11.8 mm in length, bipectinate, with about 53 rami, the longest 1.2 mm.

♂ **Genitalia** (based on preparations of Bonn PT [GP 208/84 Nässig] and 2 new specimens [GPs 1543/06, Fig. 7, & 1765/08 Naumann]): uncus bifid, with broad base (interpreted as a "primitive form" by Mell 1937b: 10); valves round, with a curved, acute internal process; saccus broad and short; juxta broadly divided, with two very short lateral arms; phallus short, vesica emerging on dorsal side, without any sclerites. No differences apparent between Shaanxi and Sichuan specimens.

♀ (Figs. 4, 5). Fwl. 33 mm, identical to ♂ except fw. and hw slightly rounder; outer field of fw. and hw. with darker outer line (also present in 1 ♂ of 2007 series); antenna 10.6 mm in length, bipectinate, with 53 rami, the longest 0.8 mm; ♀♀ genitalia not examined.

Nomenclature and taxonomy

The generic name *Calliprogonos* was first published by Mell (1937a: 32, issued on 10. iii. 1937), as "*Calliprogonos* (Brahmaeidae, n. g.)" but without a proper description or diagnosis or even association with the species *miraculosa,* which is mentioned (p. 34) but also not described nor indicated as a new species and the type of *Calliprogonos.* According to the Code (ICZN 1999: Arts. 13.3 & 13.4) both *Calliprogonos* Mell, 1937[a] and *C. miraculosa* Mell, 1937[a] are therefore *nomina nuda* and unavailable.

In the same year, however, Mell (1937b: 9, issued 25. xi. 1937) published full descriptions of both the genus and species names. This paper, entitled "Beiträge zur Fauna sinica. XIV", was evidently written and submitted before Mell (1937a), which is titled as "Beiträge ... XVI", but the publication of the XIVth contribution to Mell's series on the Chinese fauna was delayed so that the paper containing the valid descriptions of *C. miraculosa* appeared only 8 months later. The authorship of the genus name is there given as "*Calliprogonos* Mell et M. Her[ing]" but that of the single included species as "*Calliprogonos miraculosa*, sp. n.", so that the correct authorships of these names are *Calliprogonos* Mell & Hering *in* Mell, 1937[b] (not only Mell, as cited e.g. in Fletcher & Nye 1982: 28 or Naumann 2008: 111) with *C. miraculosa* Mell, 1937[b] as type species by monotypy.

A similar situation occurs with the African genus *Dactyloceras* Mell *in* Hering *in* Seitz, 1927, whose apparent intended original description (Mell 1930) was published after the first but valid establishment of the name in the Seitz volume containing the Brahmaeidae (Brosch et al. 2002: 194, Naumann et al. 2005: 30, footnote 1).

Mell (1937a: 32; 1958: 187, 188) speculated early about the origin and phylogenetic relationships of *Calliprogonos* with other brahmaeid genera. In a subsequent paper

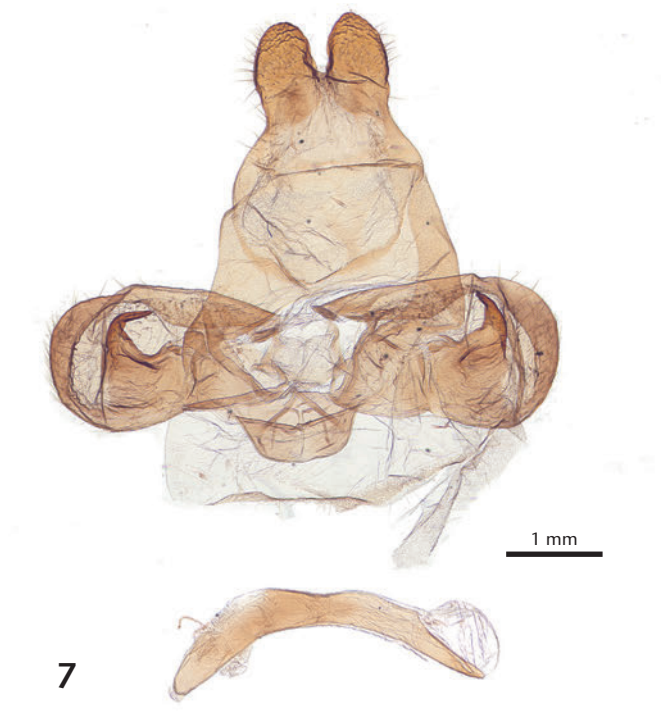

Fig. 7–8: Genitalia and legs of *Calliprogonos miraculosa*. **Fig. 7:** ♂ genitalia (GP 1543/06 Naumann); scale bar = 1 mm. **Fig. 8:** preparation no. 209/84 Nässig of ♂ legs from PT specimen in MAKB.

(Mell 1937b) he noticed the bifid uncus of *C. miraculosa* and on its basis alone proposed a relationship with *Dactyloceras,* which in part also has this character, and postulated an origin of *Calliprogonos* in Africa. His later theory about the origin of these genera (Mell 1958) appears unacceptable today. Nevertheless, the structural details of *Calliprogonos* (see Minet 1994: 85; and Fig. 7) support a position distinct from the genus *Brahmaea,* but including it within Brahmaeidae.

Zwick (2008) recently published a phylogenetic hypothesis of Bombycoidea, based on molecular data, which

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included several brahmaeid genera (also *Sabalia* and *Lemonia*) but not *Calliprogonos*, and since no other phylogenetic analysis of all brahmaeid genera is available, its relationships within the family remain obscure for now.

Samples of the recently collected specimens were submitted to the BOLD project in Canada (see Barcode of Life in the WWW), and recent results of barcoding show a closest relationship of *C. miraculosa* with all *Dactyloceras* taxa included in the subgenus *Shinocksiceras*. The placement of *D. lucinum* (Drury, 1782), type species of *Dactyloceras,* is even further separated from *Shinocksiceras* than that of *Calliprogonos,* and the proposals by Mell (1937a, 1958) are thereby supported; however, further research is necessary. The preimaginal stages of *Calliprogonos* remain unknown, but the larvae may resemble those of *Brahmaea* and also feed on Oleaceae, as are present in its habitat (Fig. 8; compare also Mell 1937b: 11) (although not identified to species so far).

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References

Brosch, U., Naumann, S., & Meister, F. (2002): Some notes on the African genus *Dactyloceras* (Lepidoptera: Brahmaeidae). – Galathea, Berichte des Kreises Nürnberger Entomologen e.V., Nürnberg, **17** (4): 189–197.

Fletcher, D. S., & Nye, I. W. B. (1982): Bombycoidea, Castnioidea, Cossoidea, Mimallonoidea, Sesioidea, Sphingoidea, Zygaenoidea. – *In:* Nye, I. W. B. (ed.), The generic names of moths of the world, vol. **4.** – London (Trustees of the British Museum (Natural History)), xiv + 192 pp.

Hering, M. (1927): 12. Familie: Brahmaeidae [species text]. – Pp. 349–351, col. pls. 47, 60 *in:* A. Seitz (ed.) (1926–1930), Die Gross-Schmetterlinge der Erde. II. Abteilung, Exotische Fauna, Bd. **14,** Die afrikanischen Spinner und Schwärmer. – Stuttgart (A. Kernen); VII + 599 pp., VII + col. pls. 1–80.

ICZN [International Commission on Zoological Nomenclature] (1999): International Code of Zoological Nomenclature. Forth edition. – London (International Trust for Zoological Nomenclature), xxix + 306 pp.

Karsch, F. (1898): Über die Arten der Lepidopteren-Gattung *Sabalia* Wlk. nebst Beschreibung einer neuen Art: *Sabalia tippelskirchi*. – Entomologische Nachrichten, Berlin, **24** (19): 289–295.

Lemaire, C., & Minet, J. (1998 ["1999"]): 18. The Bombycoidea and their relatives. – Pp. 321–353 *in:* Kristensen, N. P. (vol. ed.), Lepidoptera, moths and butterflies. Volume **1:** Evolution, systematics, and biogeography (Handbook of zoology [Fischer, M., serial ed.], vol. IV, part 35). – Berlin, New York (W. de Gruyter), x + 491 pp.

Mell, R. (1930 ["1929"]): Beiträge zur Fauna sinica. V. Die Brahmaeiden und Eupterotiden Chinas. – Deutsche Entomologische Zeitschrift, Berlin, **1929** (5): 337–494, pls. III–XII.

—— (1937a): Beiträge zur Fauna sinica. XVI. Die Areale biologisch sehr nahestehender Arten des gleichen Genus und Anpassung an kontinentale Wärmespannen als bestimmender Faktor für Arealgröße und Erscheinungszeiten der Imago. – Archiv für Naturgeschichte, Leipzig, N.F. **6** (1): 1–36.

—— (1937b): Beiträge zur Fauna sinica. XIV. Ergänzungen zur Sphingiden-, Brahmaeiden- und Eupterotidenfauna Chinas (Lep.). – Deutsche Entomologische Zeitschrift, Berlin, **1937** (1/2): 1–19, 1 pl.

—— (1958): Zur Geschichte der ostasiatischen Lepidopteren. I. Die Hebung Zentralasiens, das westchinesische Refugium zentralasiatischer Abkömmlinge und die Verbreitungsachse Sikkim/Khasiaberge–Zentralformosa (Achse V). Beiträge zur Fauna sinica XXV. – Deutsche Entomologische Zeitschrift, Berlin, N.F. **5** (1/2): 185–213.

Minet, J. (1994): The Bombycoidea: phylogeny and higher classification (Lepidoptera: Glossata). – Entomologica Scandinavica, **25** (1): 63–88.

Naumann, S. (2008): Family Brahmaeidae, Brahmaeid Moths (Bombycoidea). – Pp. 111–116, col. figs. 1100–1103 *in:* Kühne, L. (ed.), Butterflies and moth diversity of the Kakamega forest (Kenya). – Potsdam (L. Kühne); 203 pp. + 57 illustration pages without pagination (= 260 pp.).

——, Brosch, U., & Nässig, W. A. (2005): Nomenklatorische Anmerkungen zur Bildung von Namen der Artgruppe innerhalb der Gattung *Dactyloceras* Mell, 1927 (Lepidoptera: Brahmaeidae). – Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, N.F. **26** (1/2): 30.

Oberprieler, R. G., & Duke, N. J. (1994): The life history and immature stages of *Spiramiopsis comma* Hampson, 1901 (Lepidoptera: Bombycoidea), with comments on its taxonomic position and on the preimaginal characters of the Bombycoidea. – Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, N.F. **15** (3): 199–244.

Zhu H. F. & Wang L. (1983): Familie Brahmaeidae. – Pp. 414–415, pl. 136 *in:* Zhu H.-F., Wang L., Hou T. & Zhang B., Iconographia Heterocerorum Sinicorum, vol. **4.** – Beijing (Science Press) [in Chinese].

Zwick, A. (2008): Molecular phylogeny of Anthelidae and other bombycoid taxa (Lepidoptera: Bombycoidea). – Systematic Entomology, Oxford, **33:** 190–209.

Internet references

Barcode of Life: www.barcodinglife.org. – Last accessed: 22. iii. 2009.

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